

moving said second lens unit toward the image side, and shifting of an image plane due to zooming being compensated for by moving said fourth lens unit,

wherein said second lens unit consists of four single lenses including three negative lenses and one positive lens, and at least one of said four single lenses is an aspherical lens, and

wherein the zoom lens satisfies the following condition:

$$1.28 < |R24/R25| < 3.20$$

where R24 and R25 are radii of curvature of the fourth and fifth lens surfaces, respectively, when counted from the object side, in said second lens unit.--

REMARKS

Summary

Independent Claim 12 has been amended to include the features of allowable Claim 19 and amended Claims 23 recites at least one feature not disclosed or suggested by the applied art. Therefore, are the outstanding rejections of these claims still proper?

Status of the Claims

Claims 12-18, 23-26, and 28-42 are pending. Claim 19 has been canceled without prejudice. Claims 12 and 23 have been amended. Claims 35-42 have been added. Claims 12, 23, 35-39, 40, and 42 are independent.

Requested Action

Applicant requests that the Examiner reconsider and withdraw the outstanding rejections in view of the foregoing amendments and the following remarks.

Allowable subject matter

Applicant gratefully acknowledges the indication that Claims 13, 19, 25, 26, and 32 would be allowable if rewritten in independent from including all of the limitations of the base claim and any intervening claims.

In response, the features of Claim 19 have been incorporated into independent Claim 12 and Claim 19 has been canceled, and Claims 13, 25, 26, and 32 have been redrafted in independent form as new independent Claims 35-38. Therefore, Claims 12 and 35-38 are allowable.

Substantive Rejections

Claims 12, 14-18, and 20 are rejected under 35 U.S.C. § 103(a) as being unpatentable over the patent to Tochigi, et al. in view of the patent to Uzawa. Claims 23, 24, 28-31, 33, and 34 are rejected over the patent to Tochigi, et al. in view of previously cited U.S. Patent 5,963,378 (Nakamura).

Response to rejections

In response, while not conceding the propriety of the rejections, independent Claim 12 has been amended to include the features of allowable Claim 19 and independent 23 has been amended. Applicant submits that as amended, Claim 23 is allowable for the following reasons.

Independent Claim 23 relates to a zoom lens comprising, in order from an object side to an image side, a first lens unit of positive optical power, a second lens unit of negative optical power, the second lens unit moving during zooming, a third lens unit of positive optical power, and a fourth lens unit of positive optical power, the fourth lens unit moving during zooming.

Claim 23 has been amended to recite that the third lens unit has, in order from the object side to the image side, a positive lens having an aspherical surface and a negative meniscus lens having a convex surface facing to the object side.

In contrast, the patents to Tochigi, et al. and Nakamura are not understood to disclose or suggest that a third lens unit has, in order from the object side to the image side, a positive lens having an aspherical surface and a negative meniscus lens having a convex surface facing to the object side, as recited by amended Claim 23.

The failure of these references to disclose or suggest at least this feature proves fatal to establishing a prima facie case of obviousness against Claim 23, since MPEP §2142, requires that:

To establish a prima facie case of obviousness... the prior art reference (or references when combined) must teach or suggest all the claim limitations.

For this reason, amended Claim 23 is allowable over the patents to Tochigi, et al. and Nakamura.

New independent Claim 39 relates to a zoom lens similar to the zoom lens of Claim 12, prior to the being amended, except that it recites that the second lens unit consists of four single lenses including three negative lenses and one positive lens, and, of the four single lenses, a surface of the object side of the third lens in order from the object side is an aspherical surface.

In contrast, the patents to Tochigi, et al. and Uzawa are not understood to disclose or suggest that of four single lenses of a second lens unit, a surface of the object side of the third lens in order from the object side is an aspherical surface, as recited by Claim 39. For this reason, new Claim 39 is allowable over this art.

New independent Claim 41 is a rewriting of Claim 15 in independent form. This claim relates to a zoom lens comprising, in order from an object side to an image side, a first lens unit of positive refractive power, a second lens unit of negative refractive power, a third lens unit of positive refractive power and a fourth lens unit of positive refractive power, zooming from a wide-angle end to a telephoto end being effected by moving the second lens unit toward the image side, and shifting of an image plane due to zooming being compensated for by moving the fourth lens unit. The second lens unit consists of four single lenses including three negative lenses and one positive lens, and at least one of the four single lenses is an aspherical lens.

Claim 41 also recites that the zoom lens satisfies the following condition:

$$0.25 < |f_2/f_A| < 0.41$$

where

$$f_A = \sqrt{f_w \cdot f_t}$$

wherein f_2 is a focal length of said second lens unit, and f_w and f_t are focal lengths in the wide-angle end and the telephoto end of said zoom lens, respectively.

By this arrangement, the focal length of the second lens unit can be shortened, making the zoom lens compact, without compromising optical performance.

In contrast, neither the patent to Tochigi, et al., nor the patent to Uzawa disclose the concept of using an aspherical lens in a second lens unit satisfying the condition:

$0.25 < |f_2/f_A| < 0.41$, where $f_A = \sqrt{f_w \cdot f_t}$, as recited by Claim 41. Therefore, MPEP § 2142 mandates the allowance of this claim over this art.

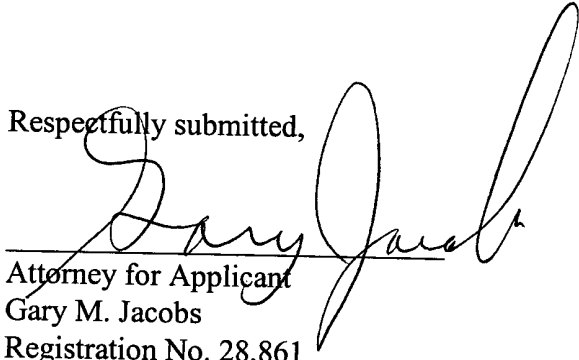
Moreover, it would not be obvious to use a second lens unit in the Tochigi, et al. patent that has an aspherical lens, as recited by Claim 41, since neither the Tochigi patent nor the Uzawa patent recognizes the ability of a second lens unit having an aspherical lens that satisfies the condition noted above to permit both miniaturization of the zoom lens and good optical performance. For this additional reason, Claim 41 is allowable over this art.

The dependent claims are allowable for the reasons given with respect to the independent claims and because they recite features which are patentable in their own right. Individual consideration of the dependent claims is respectfully solicited.

In view of the above amendments and remarks, the claims are now in allowable form. Therefore, early passage to issue is respectfully solicited.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our address listed below.

Respectfully submitted,



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MARKED-UP CLAIM SHEET

12. (Amended) A zoom lens comprising, in order from an object side to an image side, a first lens unit of positive refractive power, a second lens unit of negative refractive power, a third lens unit of positive refractive power and a fourth lens unit of positive refractive power, zooming from a wide-angle end to a telephoto end being effected by moving said second lens unit toward the image side, and shifting of an image plane due to zooming being compensated for by moving said fourth lens unit,

wherein said second lens unit consists of four single lenses including three negative lenses and one positive lens, and at least one of said four single lenses is an aspherical lens, and

wherein the zoom lens satisfies the following condition:

$$1.28 < |R24/R25| < 3.20$$

where R24 and R25 are radii of curvature of the fourth and fifth lens surfaces, respectively, when counted from the object side, in said second lens unit.

23. (Amended) A zoom lens comprising, in order from an object side to an image side, a first lens unit of positive optical power,
a second lens unit of negative optical power, said second lens unit moving during zooming,
a third lens unit of positive optical power,

a fourth lens unit of positive optical power, said fourth lens unit moving during zooming,
wherein said third lens unit has, in order from the object side to the image side, a positive lens having an aspherical surface and a negative meniscus lens having a convex surface facing the object side [has a positive lens, both surfaces of which are aspherical], and
wherein said second lens unit has three negative lenses and one positive lens.

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